

City of Kingsport Tennessee



Propane as Vehicle Fuel: Where the Rubber Meets the Road in a Municipal Environment



HISTORY

FY07 – BMA mandated a directive to reduce fuel consumption, seek cost cutting strategies and GREEN the fleet

FY07 – Biodiesel – State of Tennessee Grant Match

FY07 – First Hybrid purchased

FY08 – First full electric vehicle purchased - ZAP 3 Wheel for Waste Treatment Plant

FY10 – First Propane Conversions with Virginia Clean Cities Grant – 2 VCC Grant Conversions

FY11 – Second Propane Conversions with Virginia Clean Cities Grant – 10 VCC Grant Conversions – 3 State of Tennessee

FY11 – Propane fuel became part of new unit specifications on applicable units – Discontinued Practice in FY13

FY 12 – 7 Propane Conversions

FY13 – Awarded Grant - Tennessee Emission Reduction to purchase three electric sedans to replace gasoline models –

FY13 – 9 Propane Conversions

FY13 – Electric Salt Spreaders replaced gasoline counterparts

FY14 – 12 Propane Conversions

FY15 – 25 Propane Conversions

FY16 – 9 Propane Conversions

FY19 – 21 Propane Conversions – In Planning

ALTERNATIVE ENERGY FLEET APPLICATIONS

- Electric – Rechargeable Electric 3 Wheeled unit for Waste Treatment Plant
- *Dedicated Electric – Nissan Leaf- Fleet Motor Pool, Water Department Admin, Police - Code Enforce (3)*
- Dedicated Electric – Pickup Truck Salt Spreaders (10)
- *Hybrid – Gas/Electric – Administrative Vehicles used by Public Works, Police, Schools – (27)*
- Hybrid – Diesel/ Electric – Transportation Bucket Truck (1)
- *Bi-fuel – Gasoline/ Propane PRINZ Systems– Police Cruisers, Pickup Trucks, Utility Body Trucks*
- Dedicated Propane ROUSH – Building Maintenance Cargo Van
- *OEM Propane Zero Turn Mowers – Skag Turf Tiger, John Deere*

Current Propane Equipped Fleet

- *1 – Dedicated Propane Equipped Van*
- *17 – Bi Fuel – PRINZ - Utility Body Trucks*
- *16 – Bi Fuel – PRINZ - Pickup Trucks*
- *48 – Bi Fuel – PRINZ - Police Cars*
- *11 – Dedicated Propane Zero Turn Mower*
 - *Skag, John Deere*
- *4 – Dedicated Propane Forklifts*

97 Total

Calculating Potential Savings

Fuel Type	Fuel Price	Fuel Economy Expectation	Anticipated Lifecycle Expectation	Fuel Cost Per Mile	Total Consumption Expectation	Lifetime Fuel Cost	Conversion Cost
Gas	\$ 2.81	7	100,000.00	0.40	14,285.71	\$ 40,142.86	
Propane	\$ 1.69	5.7	100,000.00	0.30	17,636.68	\$ 29,806.00	\$ 4,100.00
Gasoline to Propane Fuel Savings:						\$ 10,336.86	
Gasoline to Propane Life Savings including conversion cost:							\$ 6,236.86
Propane Consumption Target:						95%	
Actual Savings:							\$ 5,925.02
Number of Propane Units:						37	
Total Savings Potential:							\$ 219,225.65

- Savings calculations based on 100% propane consumption consideration
- Propane consumption has to be monitored

REPORTING

2nd QTR.	Vehicle ID Information				Beginning Meter Reading	Previous Quarter Ending Meter	Quarter End Meter Reading	Mileage per Quarter	Life to Date Mileage	Gallons Gasoline for Quarter	Gallons Propane for Quarter	Total Fuel for Quarter	Propane Percentage for Quarter
Equip.#	Year	MFG	Model	Department									
1806	2008	Ford	Crown Vic	Police-Patrol	23,565	67,373	69,554	2,181	45,989	87	188	274.45	68%
1816	2008	Ford	Crown Vic	Police-Patrol	28,981	56,974	59,438	2,464	30,457	20	238	257.70	92%
1881	2009	Ford	F150	Water Maintenance	14	11,966	12,893	927	12,879	20	69	89.35	77%
1883	2009	Ford	F150	Sewer Maintenance	18	42,610	43,912	1,302	43,894	44	96	140.20	69%
1933	2010	Ford	F150	Water Maintenance	12	45,580	49,834	4,254	49,822	43	307	350.05	88%
1978	2011	Ford	Crown Vic	Police-Patrol	16	47,377	52,415	5,038	52,399	91	509	599.42	85%
1979	2011	Ford	Crown Vic	Police-Patrol	13	31,357	34,575	3,218	34,562	132	303	434.90	70%
1980	2011	Ford	Crown Vic	Police-Patrol	14	24,420	27,732	3,312	27,718	59	323	381.30	85%
1981	2011	Ford	Crown Vic	Police-Patrol	15	27,667	30,764	3,097	30,749	21	301	322.05	93%
1982	2011	Ford	Crown Vic	Police-Patrol	14	35,524	38,994	3,470	38,980	66	317	382.20	83%
1983	2011	Ford	Crown Vic	Police-Patrol	15	28,642	37,611	8,969	37,596	46	377	422.70	89%
1984	2011	Ford	Crown Vic	Police-Patrol	14	33,970	32,241	-1,729	32,227	23	488	510.80	96%
1985	2011	Ford	Crown Vic	Police-Patrol	17	24,344	27,302	2,958	27,285	47	368	415.45	89%
1986	2011	Ford	Crown Vic	Police-Patrol	14	17,132	18,879	1,747	18,865	50	122	171.80	71%
1987	2011	Ford	Crown Vic	Police-Patrol	18	29,707	33,320	3,613	33,302	102	177	278.65	63%
2043	2012	Ford	E250 Cargo Van	Building Maintenance	30	10,959	12,884	1,925	12,854	0	202	201.60	100%
2046	2012	Chevy	Silverado	Engineering	14	28,882	35,752	6,870	35,738	86	583	668.50	87%
2047	2012	Chevy	Silverado	Sewer Plant	13	20,665	24,179	3,514	24,166	148	171	319.65	54%
2048	2012	Chevy	Silverado	Sewer Plant	12	9,891	11,605	1,714	11,593	253	26	279.45	9%
2065	2012	Ford	F450	Water Maintenance	116	18,232	20,820	2,588	20,704	199	297	495.85	60%
2066	2012	Ford	F450	Water Maintenance	114	13,990	16,517	2,527	16,403	120	374	493.20	76%
2067	2012	Ford	F350	Sewer Plant	124	7,545	9,343	1,798	9,219	135	148	282.90	52%
2087	2012	Ford	F350	Transportation	125	11,874	15,860	3,986	15,735	33	554	587.85	94%
2108	2014	Ford	F250	Water Maintenance	12	1,196	2,237	1,041	2,225	14	111	124.25	89%
2109	2014	Ford	F350	Transportation	120	3,462	7,154	3,692	7,034	56	493	548.95	90%
2110	2014	Ford	F350	Transportation	120	4,998	8,972	3,974	8,852	42	541	582.62	93%
2111	2014	Ford	F250	Bays Mountain Park	12	1,152	2,460	1,308	2,448	26	168	194.00	86%
2112	2014	Ford	F250	Bays Mountain Park	121	3,234	5,479	2,245	5,358	44	242	285.85	85%
2116	2013	Dodge	Charger	Police-Patrol	11	11	3,773	3,762	3,762	10	65	75.35	87%
2136	2014	Ford	F450	Sewer Plant	12	1,576	3,937	2,361	3,925	171	336	507.25	66%
2138	2014	Ford	F350	Grounds Maintenance	133	261	1,438	1,177	1,305	30	247	276.60	89%
2139	2014	Ford	F350	Park Maintenance	120	213	1,354	1,141	1,234	19	200	218.45	91%
2140	2014	Ford	F350	PW Street Maint.	133	185	2,195	2,010	2,062	63	284	347.10	82%
2141	2014	Ford	F350	PW Street Maint.	150	184	1,304	1,120	1,154	37	130	167.50	78%
2142	2014	Ford	F350	PW Street Maint.	133	172	2,484	2,312	2,351	122	190	312.45	61%
2152	2014	Ford	F350	Refuse-Disposal	12	12	2,202	2,190	2,190	146	135	281.85	48%
\$ 2.9107	Avg. Gas Price	\$	1.6654	Avg. Propane Price	54,377	663,337	761,413	98,076	707,036	2,606	9,676	12,282	78.78%

PROPANE PROS

KINGSPORT'S EXPERIENCE

- Environmental Benefits
- Fuel Savings
- Improved Vehicle Performance
- Employee Appreciation
- Public Perception
- Creates American Jobs

Benefits

- Since 2011, Kingsport has used 333,121 gallons of propane as a motor fuel which has reduced CO2 emissions by 289 short tons
- Since 2011, Kingsport has saved the local taxpayer an estimated \$250,000 in refueling costs

AND CONSIDERATIONS

KINGSPORT'S EXPERIENCE

- Unrealistic Expectations
- *Availability for Applications in a Fleet are Limited*
- Operating - Employee Trepidation and Concerns
- *Vendor Participation*
- Vendor Support
- *Potential Extended Delivery or In Service Times*
- Warranty Issues
- *Technician Training Needs and Costs*
- Maintenance Facility Upgrades for Gaseous Fuels
- *Vehicle Storage Issues*
- Emergency Response Issues
- *Issues arising due to the Nations transition of energy types*

TIPS FOR SUCCESS

- Cultivate, Cultivate, Cultivate Your Vendors, Supplier, and Upfitter Relationships
- *Train and Educate Your Vendors, Suppliers, and Upfitters*
- Be Clear and Definitive About Objectives & Expectations
- *Understand All the Processes Involved*
- Host Pre-bid Conferences if Conversions Included in Vehicle Specifications
- *Introduce Your Vendors, Suppliers and Upfitters to Each Other*
- Don't Expect The Impossible
- ***Sell The Cost Savings Upward and the Performance Downward***
- Provided User Support and Customer Service
- *Address Vehicle Performance Issues Quickly*
- ABOVE ALL - BE PATIENT

2011 Ford F150 Bi Fuel



2014 Ford F450 Bi Fuel



2013 Dodge Charger Bi Fuel



2014 F350 Ford Bi Fuel



THANK YOU

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